

8771

18 August 2014

Hutt City Council  
Private Bag 31912  
Lower Hutt

Dear [REDACTED]

### **Initial Seismic Assessment Report - Hutt Recreation Ground Grandstand, Hutt Recreation Ground, Lower Hutt**

We have now completed an Initial Seismic Assessment (ISA) of the grandstand building at Hutt Recreation Ground, Lower Hutt using the Initial Evaluation Procedure (IEP). The assessment was carried out after completing a site visit and reviewing some drawings.

#### **Executive Summary**

This building was assessed as having a 50% NBS in the transverse direction and 50%NBS in the longitudinal direction, which gives it a seismic grade C. This building is therefore not regarded as earthquake prone but is regarded as earthquake risk.

The building has been assumed to have an importance Level 3 (Where more than 300 people can congregate in one area).

The ISA is considered to provide a relatively quick, high-level and qualitative measure of the building's performance. A more reliable result will be obtained from a Detailed Seismic Assessment (DSA) and is recommended for this building. A Detailed Seismic Assessment could find structural aspects of concern that have not been identified from the IEP. Alternatively, a detailed structural assessment may show that structural aspects of potential concern identified in this IEP may have in fact been addressed in the design of the building.

#### **Introduction**

Hutt City Council has engaged [REDACTED] to carry out an Initial Seismic Assessment (ISA) of the grandstand building at Hutt Recreation Ground, Lower Hutt using the Initial Evaluation Procedure (IEP) as set out in the New Zealand Society for Earthquake Engineering publication "Assessment and Improvement of the Structural Performance of Buildings in Earthquakes" dated June 2006.

[REDACTED] inspected the building on 12<sup>th</sup> August 2014.

The grandstand was built originally in 1934. It was a timber framed structure with some reinforced concrete walls at ground floor (one long wall at front along the longitudinal direction and six short walls attached in transverse direction)

The six short concrete walls were strengthened and some 2.2m high (not full height) reinforced concrete block walls were built at ground floor during the grandstand refurbishment in 1992.

The grandstand was reconstructed in 1999 after it was almost fully destroyed by fire. The foundations and reinforced concrete/masonry walls were reused. Built on this, the new grandstand has: driven steel pile foundations, reinforced concrete frames, steel frames, reinforced



concrete/masonry walls and reinforced concrete floor slabs at lower floors, and a timber framed light roof supported by a timber framed walls at top floor. A lightweight gymnasium with steel portal frames is attached to the north-west side of the grandstand. We have seen some architectural and structural drawings.

## **Background to the IEP and Its Limitations**

The IEP procedure was developed in 2006 by the New Zealand Society for Earthquake Engineering (NZSEE) and updated in 2013 to reflect experience with its application and as a result of experience in the Canterbury earthquakes. It is a tool to assign a percentage of New Building Standard (%NBS) score and associated grade to a building as part of an initial seismic assessment of existing buildings.

The IEP enables territorial authorities, building owners and managers to review their building stock as part of an overall risk management process.

Characteristics and limitations of the IEP include:

- It tends to be somewhat conservative, identifying some buildings as earthquake prone, or having a lower %NBS score, which subsequent detailed investigation may indicate is less than actual performance. However, there will be exceptions, particularly when critical structural weaknesses (CSWs) are present that have not been recognised from the level of investigation employed.
- It can be undertaken with variable levels of available information, eg exterior only inspection, structural drawings available or not, interior inspection, etc. The more information available the more representative the IEP result is likely to be. The IEP records the information that has formed the basis of the assessment and consideration of this is important when determining the likely reliability of the result.
- It is an initial, first-stage review. Buildings or specific issues which the IEP process flags as being problematic or as potentially critical structural weaknesses, need further detailed investigation and evaluation. A Detailed Seismic Assessment is recommended if the seismic status of a building is critical to any decision making.
- The IEP assumes that the buildings have been designed and built in accordance with the building standard and good practice current at the time. In some instances, a building may include design features ahead of its time - leading to better than predicted performance. Conversely, some unidentified design or construction issues not picked up by the IEP process may result in the building performing not as well as predicted.
- It is a largely qualitative process, and should be undertaken or overseen by an experienced engineer. It involves considerable knowledge of the earthquake behaviour of buildings, and judgement as to key attributes and their effect on building performance. Consequently, it is possible that the %NBS derived for a building by independent experienced engineers may differ.
- An IEP may over-penalise some apparently critical features which could have been satisfactorily taken into account in the design.
- An IEP does not take into account the seismic performance of non-structural items such as ceiling, plant, services or glazing.

Experience to date is that the IEP is a useful tool to identify potential issues and expected overall performance of a building in an earthquake. However, the process and the associated %NBS and grade should be considered as only indicative of the building's compliance with current code requirements. A detailed investigation and analysis of the building will typically be required to provide a definitive assessment.

An IEP score above 34%NBS should be considered sufficient to classify the building as not earthquake prone. However, if further information comes available reassessment may be required.

### **Basis for the Assessment**

The information we have used for our IEP assessment includes:

- The grandstand was reconstructed in 1999.
- Site subsoil class D "Deep or soft soil sites" has been used based on mapping from GNS.
- The period has been determined as being 0.40 seconds based on 12m high reinforced concrete framed building with some reinforced concrete/masonry walls.
- The building has been assumed to have an importance Level 3 (Where more than 300 people can congregate in one area).
- A ductility of  $\mu = 3$  has been assumed which is consistent with a structure with reinforced concrete/masonry walls.
- The gymnasium portal knee part way up loadbearing masonry wall supporting concrete floor and the connections between the old and new block walls are potential critical structural weaknesses.
- An adjustment factor F of 1.2 has been adopted in the transverse and longitudinal directions because the building appears to be well built using modern techniques.

### **Building Description**

The grandstand, located at near 135 Woburn Road, Lower Hutt, is a three storey building rebuilt in 1999, in which there are reinforced concrete frames, steel frames, reinforced concrete and masonry walls, and reinforced concrete floor slabs at lower floors, and a timber framed light roof supported by a timber framed walls at top floor. A lightweight gymnasium with steel portal frames is attached to the north-west side of the grandstand. This grandstand is in use currently.

### **IEP Assessment Results**

Our IEP assessment of this building indicates the building can achieve 50%NBS in the transverse and longitudinal directions. The score is *above* the threshold for Earthquake Prone Buildings (34%NBS) but *below* the threshold for Earthquake Risk Buildings (67%NBS) as defined by the New Zealand Society for Earthquake Engineering (NZSEE) and the New Zealand Building Code. This building is therefore not regarded as earthquake prone but is regarded as earthquake risk, corresponding to a 'Grade C' building as defined by the (NZSEE) building grading scheme.

The key assumptions made during our assessment are shown in Table 1 below. Refer also to the attached IEP assessment.

### **IEP Grades and Relative Risk**

Table 2 taken from the NZSEE Guidelines provides the basis of a proposed grading system for existing buildings, as one way of interpreting the %NBS building score. It can be seen that occupants in *Earthquake Prone* buildings (less than 34%NBS) are exposed to more than 10 times the risk that they would be in a similar new building. For buildings that are potentially

*Earthquake Risk* (less than 67%NBS), but not *Earthquake Prone*, the risk is at least 5 times greater than that of an equivalent new building. Broad descriptions of the life-safety risk can be assigned to the building grades as shown in Table 2.

This building has been classified by the IEP as a grade C building and is therefore considered to be an earthquake risk.

The New Zealand Society for Earthquake Engineering (which provides authoritative advice to the legislation makers, and should be considered to represent the consensus view of New Zealand structural engineers) classifies a buildings achieving greater than 67%NBS as “Low Risk”, and having “Acceptable (improvement may be desirable)” building structural performance.

**Table 1: IEP Assessment Results**

IEP Item	Assumption	Justification
Date of Building Design	1999	Structural drawings by [REDACTED]
Soil Type	D	Mapping from GNS
Building Importance Level	3	Where more than 300 people can congregate in one area.
Ductility of Structure	3	Reinforced concrete/masonry walls
Plan Irregularity Factor, A	0.7 In longitudinal direction	A gymnasium is attached to the north-west side of the grandstand. Seismic resistance located one side of the building at top floor.
Vertical Irregularity Factor, B	0.7	The roof and upper floor are light timber framed and the lower levels are reinforced concrete frames and concrete/masonry walls with concrete floors. The viewing deck is on a slope.
Short Columns Factor, C	no	No short columns are identified
Pounding Factor, D	no	A gymnasium is treated as a part of the grandstand
Site Characteristic	Insignificant in longitudinal direction and significant in transverse direction	The building is parallel and adjacent to Opahu Stream. Potential liquefaction may cause spread in the transverse direction.
F Factor	1.2 in longitudinal and transverse directions	The building appears to be well built using modern techniques and well documented.

**Table 2: Relative Earthquake Risk**

Building Grade	Percentage of New Building Strength (%NBS)	Approx. Risk Relative to a New Building	Life-safety Risk Description
A+	>100	<1	low risk
A	80 to 100	1 to 2 times	low risk
B	67 to 79	2 to 5 times	low or medium risk
C	34 to 66	5 to 10 times	medium risk
D	20 to 33	10 to 25 times	high risk
E	<20	more than 25 times	very high risk

## Seismic Restraint of Non-Structural Items

During an earthquake, the safety of people can be put at risk due to non-structural items falling on them. These items should be adequately seismically restrained, where possible, to the NZS 4219:2009 "The Seismic Performance of Engineering Systems in Buildings".

An assessment has not been made of the bracing of the ceilings, in-ceiling ducting, services and plant. We have also not checked whether tall or heavy furniture has been seismically restrained or not. These issues are outside the scope of this initial assessment but could be the subject of another investigation.

## Conclusion

Our ISA assessment for this building, carried out using the IEP indicates an overall score of 50%NBS which corresponds to a Grade C building, as defined by the NZSEE building grading scheme. This is *above* the threshold for Earthquake Prone Buildings (34%NBS) but *below* the threshold for Earthquake Risk Buildings (67%NBS) as defined by the NZSEE and the New Zealand Building Code.

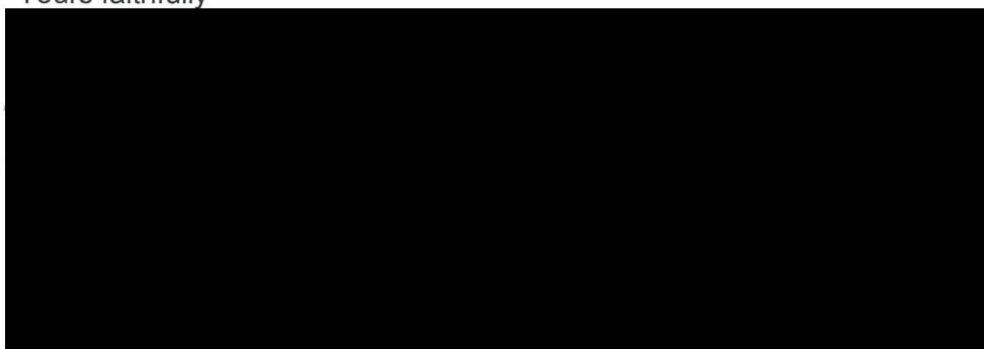
The ISA is considered to provide a relatively quick, high-level and qualitative measure of the building's performance. In order to confirm the seismic performance of this building with more reliability you may wish to request a DSA. A DSA would likely focus on the following issues: the Gymnasium portal knee part way up loadbearing masonry wall supporting concrete floor, the connections between the old and new block walls, liquefaction and lateral spreading, and building response to earthquake shaking.

A DSA would also investigate other potential weaknesses that may not have been considered in the initial seismic assessment.

We trust this letter and initial seismic assessment meets your current requirements. We would be pleased to discuss further with you any issues raised in this report.

Please do not hesitate to contact me if you would like clarification of any aspect of this letter.

Yours faithfully



**Appendix 1: IEP Form**

**Initial Evaluation Procedure (IEP) Assessment - Completed for {Hutt City Council}**

**WARNING!!** This initial evaluation has been carried out solely as an initial seismic assessment of the building following the procedure set out in the New Zealand Society for Earthquake Engineering document "Assessment and Improvement of the Structural Performance of Buildings in Earthquakes, June 2006". This spreadsheet must be read in conjunction with the limitations set out in the accompanying report, and should not be relied on by any party for any other purpose. Detailed inspections and engineering calculations, or engineering judgements based on them, have not been undertaken, and these may lead to a different result or seismic grade.

Street Number & Name:	Near 135 Woburn Road, Lower Hutt	Job No.:	8771
AKA:		By:	JW
Name of building:	Hutt Recreation Ground Grandstand	Date:	12/08/2014
City:	Lower Hutt	Revision No.:	1

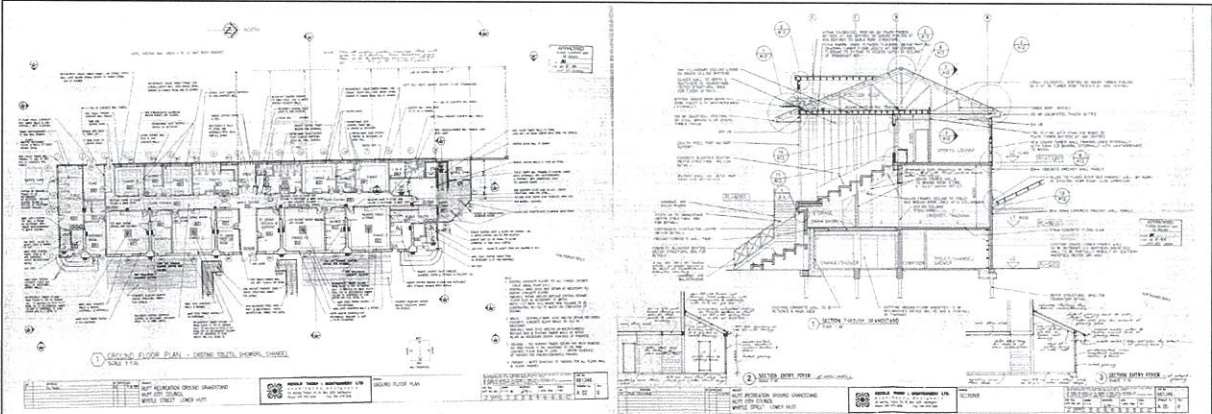
**Table IEP-1 Initial Evaluation Procedure Step 1**

**Step 1 - General Information**

**1.1 Photos (attach sufficient to describe building)**



**1.2 Sketches (plans etc, show items of interest)**



**1.3 List relevant features (Note: only 10 lines of text will print in this box. If further text required use Page 1a)**

The grandstand was built originally in 1934. It was a timber framed structure with some reinforced concrete walls at ground floor (one long wall at front along the longitudinal direction and six short walls attached in transverse direction). The six short concrete walls were strengthened and some not full height (2.2m high) reinforced concrete block walls were built at ground floor during the refurbishment in 1992. The grandstand was reconstructed in 1999 after it was almost fully destroyed by fire. The foundations and reinforced concrete/masonry walls were reused. Built on this, the new grandstand has: driven piles foundations, reinforced concrete walls, reinforced concrete frames, steel frames reinforced concrete block walls and reinforced concrete floor slabs at lower floors; a timber framed light roof and supported by a timber framed walls at the top floor. A lightweight gymnasium with steel portal frames is attached to the north-west side of the grandstand.

**1.4 Note information sources**

Tick as appropriate

Visual Inspection of Exterior    
 Visual Inspection of Interior    
 Drawings (note type)

Specifications    
 Geotechnical Reports    
 Other (list)

Architectural and structural drawings (1934, 1992 and 1999)

Initial Evaluation Procedure (IEP) Assessment - Completed for {Hutt City Council}

Street Number & Name:	Near 135 Woburn Road, Lower Hutt	Job No.:	8771
AKA:		By:	JW
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Table IEP-2 Initial Evaluation Procedure Step 2

Step 2 - Determination of (%NBS)<sub>b</sub>

(Baseline (%NBS) for particular building - refer Section B5)

2.1 Determine nominal (%NBS) = (%NBS)<sub>nom</sub>

	Longitudinal	Transverse
<b>a) Building Strengthening Data</b>		
Tick if building is known to have been strengthened in this direction	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
If strengthened, enter percentage of code the building has been strengthened to	100%	100%
If strengthened, enter original design date for information	1999	
<b>b) Year of Design/Strengthening, Building Type and Seismic Zone</b>		
	Pre 1935 <input type="checkbox"/>	Pre 1935 <input type="checkbox"/>
	1935-1965 <input type="checkbox"/>	1935-1965 <input type="checkbox"/>
	1965-1976 <input type="checkbox"/>	1965-1976 <input type="checkbox"/>
	1976-1984 <input type="checkbox"/>	1976-1984 <input type="checkbox"/>
	1984-1992 <input type="checkbox"/>	1984-1992 <input type="checkbox"/>
	1992-2004 <input checked="" type="checkbox"/>	1992-2004 <input checked="" type="checkbox"/>
	2004-2011 <input type="checkbox"/>	2004-2011 <input type="checkbox"/>
	Post Aug 2011 <input type="checkbox"/>	Post Aug 2011 <input type="checkbox"/>
Building Type:	<input type="text"/>	<input type="text"/>
Seismic Zone:	<input type="text"/>	<input type="text"/>
<b>c) Soil Type</b>		
From NZS1170.5:2004, CI 3.1.3 :	D Soft Soil	D Soft Soil
From NZS4203:1992, CI 4.6.2.2 : (for 1992 to 2004 and only if known)	Flexible	Flexible
<b>d) Estimate Period, T</b>		
Comment:		
	h <sub>n</sub> = 12	12 m
	A <sub>c</sub> = 1.00	1.00 m <sup>2</sup>
Moment Resisting Concrete Frames:	<input type="checkbox"/>	<input type="checkbox"/>
Moment Resisting Steel Frames:	<input type="checkbox"/>	<input type="checkbox"/>
Eccentrically Braced Steel Frames:	<input type="checkbox"/>	<input type="checkbox"/>
All Other Frame Structures:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Concrete Shear Walls:	<input type="checkbox"/>	<input type="checkbox"/>
Masonry Shear Walls:	<input type="checkbox"/>	<input type="checkbox"/>
User Defined (input Period):	<input type="checkbox"/>	<input type="checkbox"/>
Where h <sub>n</sub> = height in metres from the base of the structure to the uppermost seismic weight or mass.	T: 0.40	0.40
<b>e) Factor A:</b> Strengthening factor determined using result from (a) above (set to 1.0 if not strengthened)	Factor A: 1.00	1.00
<b>f) Factor B:</b> Determined from NZSEE Guidelines Figure 3A.1 using results (a) to (e) above	Factor B: 0.22	0.22
<b>g) Factor C:</b> For reinforced concrete buildings designed between 1976-84 Factor C = 1.2, otherwise take as 1.0.	Factor C: 1.00	1.00
<b>h) Factor D:</b> For buildings designed prior to 1935 Factor D = 0.8 except for Wellington where Factor D may be taken as 1, otherwise take as 1.0.	Factor D: 1.00	1.00
(%NBS) <sub>nom</sub> = AxBxCxD	(%NBS) <sub>nom</sub> 22%	22%

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Initial Evaluation Procedure (IEP) Assessment - Completed for {Hutt City Council}

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Table IEP-2 Initial Evaluation Procedure Step 2 continued

2.2 Near Fault Scaling Factor, Factor E

If  $T \leq 1.5\text{sec}$ , Factor E = 1

a) Near Fault Factor,  $N(T,D)$

(from NZS1170.5:2004, Cl 3.1.6)

Longitudinal

$N(T,D)$ : 1

Transverse

1

b) Factor E

=  $1/N(T,D)$

Factor E: 1.00

1.00

2.3 Hazard Scaling Factor, Factor F

a) Hazard Factor, Z, for site

Location: Hutt Valley-south of Taita Gc

Z = 0.4 (from NZS1170.5:2004, Table 3.3)

$Z_{1992}$  = 1.2 (NZS4203:1992 Zone Factor from accompanying Figure 3.5(b))

$Z_{2004}$  = 0.4 (from NZS1170.5:2004, Table 3.3)

b) Factor F

For pre 1992

=  $1/Z$

For 1992-2011

=  $Z_{1992}/Z$

For post 2011

=  $Z_{2004}/Z$

Factor F: 3.00

3.00

2.4 Return Period Scaling Factor, Factor G

a) Design Importance Level, I

(Set to 1 if not known. For buildings designed prior to 1965 and known to be designed as a public building set to 1.25. For buildings designed 1965-1976 and known to be designed as a public building set to 1.33 for Zone A or 1.2 for Zone B. For 1976-1984 set I value.)

I = 1

1

b) Design Risk Factor,  $R_o$

(set to 1.0 if other than 1976-2004, or not known)

Category II  
 $R_o$  = 1.2

Category II  
1.2

c) Return Period Factor, R

(from NZS1170.0:2004 Building Importance Level)

Choose Importance Level

1  2  3  4  
R = 1.3

1  2  3  4  
1.3

d) Factor G

=  $IR_o/R$

Factor G: 0.92

0.92

2.5 Ductility Scaling Factor, Factor H

a) Available Displacement Ductility Within Existing Structure

Comment:

Both 1992 and 1999 alterations were well detailed. Note: a lower ductility would not change factor H in this instance.

$\mu$  = 3.00

3.00

b) Factor H

For pre 1976 (maximum of 2)  
For 1976 onwards

=  $k_{\mu}$   
= 2.00  
= 1  
Factor H: 1.00

$k_{\mu}$   
2.00  
1  
1.00

(where  $k_{\mu}$  is NZS1170.5:2004 Inelastic Spectrum Scaling Factor, from accompanying Table 3.3)

2.6 Structural Performance Scaling Factor, Factor I

a) Structural Performance Factor,  $S_p$

(from accompanying Figure 3.4)

Tick if light timber-framed construction in this direction

$S_p$  = 0.70

0.70

b) Structural Performance Scaling Factor

=  $1/S_p$

Factor I: 1.43

1.43

Note Factor B values for 1992 to 2004 have been multiplied by 0.67 to account for  $S_p$  in this period

2.7 Baseline %NBS for Building, (%NBS)<sub>b</sub>

(equals (%NBS)<sub>nom</sub> x E x F x G x H x I)

88%

88%

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Initial Evaluation Procedure (IEP) Assessment - Completed for {Hutt City Council}

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Table IEP-3 Initial Evaluation Procedure Step 3

Step 3 - Assessment of Performance Achievement Ratio (PAR)

(Refer Appendix B - Section B3.2)

a) Longitudinal Direction

potential CSWs	Effect on Structural Performance (Choose a value - Do not interpolate)	Factors
<b>3.1 Plan Irregularity</b>		
Effect on Structural Performance	<input type="radio"/> Severe <input checked="" type="radio"/> Significant <input type="radio"/> Insignificant	Factor A <input type="text" value="0.7"/>
The seismic resistant walls at the upper level are located at the rear of the grandstand and not well distributed around the structure and a gymnasium is attached to the north-west side of the grandstand.		
<b>3.2 Vertical Irregularity</b>		
Effect on Structural Performance	<input type="radio"/> Severe <input checked="" type="radio"/> Significant <input type="radio"/> Insignificant	Factor B <input type="text" value="0.7"/>
The roof and upper floor are light timber framed and the lower levels are reinforced concrete frames and concrete/masonry walls with concrete floors. The viewing deck is on a slope.		
<b>3.3 Short Columns</b>		
Effect on Structural Performance	<input type="radio"/> Severe <input type="radio"/> Significant <input checked="" type="radio"/> Insignificant	Factor C <input type="text" value="1.0"/>
Comment		
<b>3.4 Pounding Potential</b>		
(Estimate D1 and D2 and set D = the lower of the two, or 1.0 if no potential for pounding, or consequences are considered to be minimal)		

a) Factor D1: - Pounding Effect

Note:  
Values given assume the building has a frame structure. For stiff buildings (eg shear walls), the effect of pounding may be reduced by taking the coefficient to the right of the value applicable to frame buildings.

Factor D1 For Longitudinal Direction:

Table for Selection of Factor D1	Severe 0<Sep<.005H	Significant .005<Sep<.01H	Insignificant Sep>.01H
Alignment of Floors within 20% of Storey Height	<input type="radio"/> 1	<input type="radio"/> 1	<input checked="" type="radio"/> 1
Alignment of Floors not within 20% of Storey Height	<input type="radio"/> 0.4	<input type="radio"/> 0.7	<input type="radio"/> 0.8

b) Factor D2: - Height Difference Effect

Factor D2 For Longitudinal Direction:

Table for Selection of Factor D2	Severe 0<Sep<.005H	Significant .005<Sep<.01H	Insignificant Sep>.01H
Height Difference > 4 Storeys	<input type="radio"/> 0.4	<input type="radio"/> 0.7	<input type="radio"/> 1
Height Difference 2 to 4 Storeys	<input type="radio"/> 0.7	<input type="radio"/> 0.9	<input type="radio"/> 1
Height Difference < 2 Storeys	<input type="radio"/> 1	<input type="radio"/> 1	<input checked="" type="radio"/> 1

Comment

Factor D

3.5 Site Characteristics - Stability, landslide threat, liquefaction etc as it affects the structural performance from a life-safety perspective

Effect on Structural Performance	<input type="radio"/> Severe <input type="radio"/> Significant <input checked="" type="radio"/> Insignificant	Factor E <input type="text" value="1.0"/>
Potential liquefaction may cause spread in the transverse direction.		

3.6 Other Factors - for allowance of all other relevant characteristics of the building

For ≤ 3 storeys - Maximum value 2.5  
otherwise - Maximum value 1.5.  
No minimum.

Factor F

Record rationale for choice of Factor F:  
Well built using modern techniques.

3.7 Performance Achievement Ratio (PAR)  
(equals A x B x C x D x E x F)

PAR  
Longitudinal

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**Initial Evaluation Procedure (IEP) Assessment - Completed for {Hutt City Council}**

Street Number & Name:	Near 135 Woburn Road, Lower Hutt	Job No.:	8771
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**Table IEP-3 Initial Evaluation Procedure Step 3**

**Step 3 - Assessment of Performance Achievement Ratio (PAR)**

(Refer Appendix B - Section B3.2)

**b) Transverse Direction**

potential CSWs	Effect on Structural Performance (Choose a value - Do not interpolate)	Factors
<b>3.1 Plan Irregularity</b> Effect on Structural Performance <input type="radio"/> Severe <input type="radio"/> Significant <input checked="" type="radio"/> Insignificant The grandstand is reasonably regular in the transverse direction. The light gym addition is offset but thought not to affect the overall building response unduly, except as accounted for in factor B below.		Factor A <input type="text" value="1.0"/>
<b>3.2 Vertical Irregularity</b> Effect on Structural Performance <input type="radio"/> Severe <input checked="" type="radio"/> Significant <input type="radio"/> Insignificant The roof and upper floor are light timber framed and the lower levels are reinforced concrete frames and concrete/masonry walls with concrete floors. The viewing deck is on a slope.		Factor B <input type="text" value="0.7"/>
<b>3.3 Short Columns</b> Effect on Structural Performance <input type="radio"/> Severe <input type="radio"/> Significant <input checked="" type="radio"/> Insignificant Comment		Factor C <input type="text" value="1.0"/>
<b>3.4 Pounding Potential</b> (Estimate D1 and D2 and set D = the lower of the two, or 1.0 if no potential for pounding, or consequences are considered to be minimal)		

**a) Factor D1: - Pounding Effect**

**Note:**  
 Values given assume the building has a frame structure. For stiff buildings (eg shear walls), the effect of pounding may be reduced by taking the coefficient to the right of the value applicable to frame buildings.

**Factor D1 For Transverse Direction:**

Table for Selection of Factor D1	Severe	Significant	Insignificant
Separation	0<Sep<.005H	.005<Sep<.01H	Sep>.01H
Alignment of Floors within 20% of Storey Height	<input type="radio"/> 1	<input type="radio"/> 1	<input checked="" type="radio"/> 1
Alignment of Floors not within 20% of Storey Height	<input type="radio"/> 0.4	<input type="radio"/> 0.7	<input type="radio"/> 0.8

Comment:

**b) Factor D2: - Height Difference Effect**

**Factor D2 For Transverse Direction:**

Table for Selection of Factor D2	Severe	Significant	Insignificant
	0<Sep<.005H	.005<Sep<.01H	Sep>.01H
Height Difference > 4 Storeys	<input type="radio"/> 0.4	<input type="radio"/> 0.7	<input type="radio"/> 1
Height Difference 2 to 4 Storeys	<input type="radio"/> 0.7	<input type="radio"/> 0.9	<input type="radio"/> 1
Height Difference < 2 Storeys	<input type="radio"/> 1	<input type="radio"/> 1	<input checked="" type="radio"/> 1

Comment

Factor D

**3.5 Site Characteristics - Stability, landslide threat, liquefaction etc as it affects the structural performance from a life-safety perspective**

Effect on Structural Performance <input type="radio"/> Severe <input checked="" type="radio"/> Significant <input type="radio"/> Insignificant	Factor E <input type="text" value="0.7"/>
The building is parallel and adjacent to Opahu Stream. Lateral spreading is a likely consequence of liquefaction triggering of the severity predicted for nearby site for the ULS level earthquake.	

**3.6 Other Factors - for allowance of all other relevant characteristics of the building**

For ≤ 3 storeys - Maximum value 2.5  
 otherwise - Maximum value 1.5.  
 No minimum.

Factor F

**Record rationale for choice of Factor F:**  
 Well built using modern techniques.

**3.7 Performance Achievement Ratio (PAR)**  
 (equals A x B x C x D x E x F)

**PAR**  
 Transverse

**WARNING!!** This initial evaluation has been carried out solely as an initial seismic assessment of the building following the procedure set out in the New Zealand Society for Earthquake Engineering document "Assessment and Improvement of the Structural Performance of Buildings in Earthquakes, June 2006". This spreadsheet must be read in conjunction with the limitations set out in the accompanying report, and should not be relied on by any party for any other purpose. Detailed inspections and engineering calculations, or engineering judgements based on them, have not been undertaken, and these may lead to a different result or seismic grade.

**Initial Evaluation Procedure (IEP) Assessment - Completed for {Hutt City Council}**

Street Number & Name:	Near 135 Woburn Road, Lower Hutt	Job No.:	8771
AKA:		By:	JW
Name of building:	Hutt Recreation Ground Grandstand	Date:	12/08/2014
City:	Lower Hutt	Revision No.:	1

**Table IEP-4 Initial Evaluation Procedure Steps 4, 5, 6 and 7**

**Step 4 - Percentage of New Building Standard (%NBS)**

	Longitudinal	Transverse
4.1 Assessed Baseline %NBS (%NBS) <sub>b</sub> (from Table IEP - 1)	88%	88%
4.2 Performance Achievement Ratio (PAR) (from Table IEP - 2)	0.59	0.59
4.3 PAR x Baseline (%NBS) <sub>b</sub>	50%	50%
4.4 Percentage New Building Standard (%NBS) (Use lower of two values from Step 4.3)		50%

**Step 5 - Potentially Earthquake Prone?**

(Mark as appropriate)

%NBS ≤ 34

**NO**

**Step 6 - Potentially Earthquake Risk?**

(Mark as appropriate)

%NBS < 67

**YES**

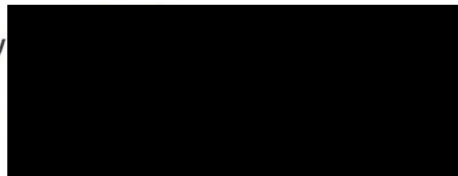
**Step 7 - Provisional Grading for Seismic Risk based on IEP**

Seismic Grade

**C**

Additional Comments (items of note affecting IEP score)

Evaluation Confirmed by



**Relationship between Grade and %NBS :**

<b>Grade:</b>	<b>A+</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
<b>%NBS:</b>	<b>&gt; 100</b>	<b>100 to 80</b>	<b>79 to 67</b>	<b>66 to 34</b>	<b>33 to 20</b>	<b>&lt; 20</b>

**WARNING!!** This initial evaluation has been carried out solely as an initial seismic assessment of the building following the procedure set out in the New Zealand Society for Earthquake Engineering document "Assessment and Improvement of the Structural Performance of Buildings in Earthquakes, June 2006". This spreadsheet must be read in conjunction with the limitations set out in the accompanying report, and should not be relied on by any party for any other purpose. Detailed inspections and engineering calculations, or engineering judgements based on them, have not been undertaken, and these may lead to a different result or seismic grade.

Initial Evaluation Procedure (IEP) Assessment - Completed for {Hutt City Council}

Street Number & Name:	Near 135 Woburn Road, Lower Hutt	Job No.:	8771
AKA:		By:	JW
Name of building:	Hutt Recreation Ground Grandstand	Date:	12/08/2014
City:	Lower Hutt	Revision No.:	1

Table IEP-5 Initial Evaluation Procedure Step 8

Step 8 - Identification of potential Severe Critical Structural Weaknesses that could result in significant risk to a significant number of occupants

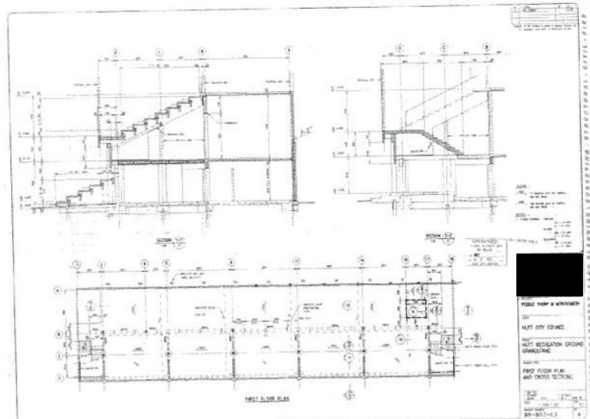
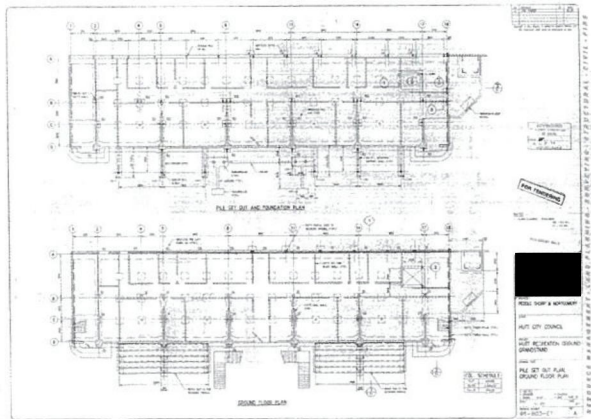
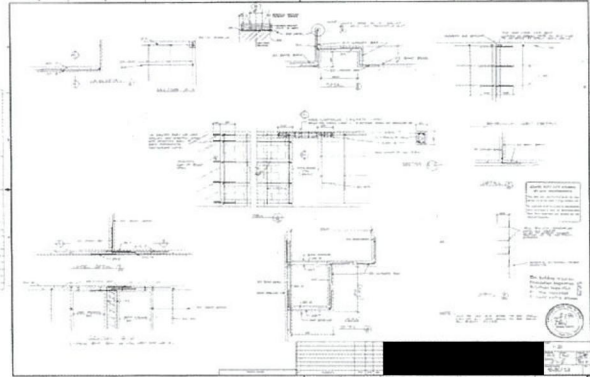
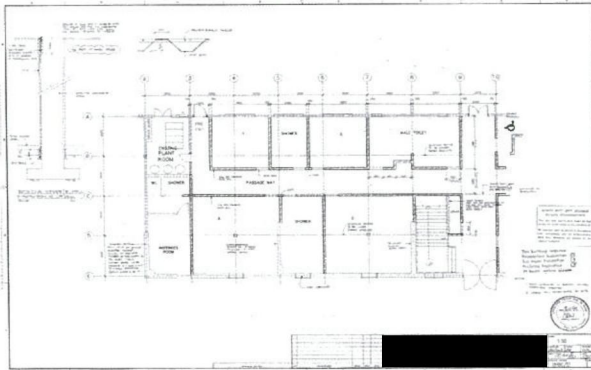
8.1 Number of storeys above ground level 3

8.2 Presence of heavy concrete floors and/or concrete roof? (Y/N) Y

Engineer's comment: This building is an IL=3 building because of high occupancy. The CSW's for future consideration include:

1. Portal knee part way up loadbearing masonry supporting concrete floor
2. Lateral support of free standing blockwall and connection to new block wall at end.

~~Occupancy not considered to be significant, no further consideration required~~



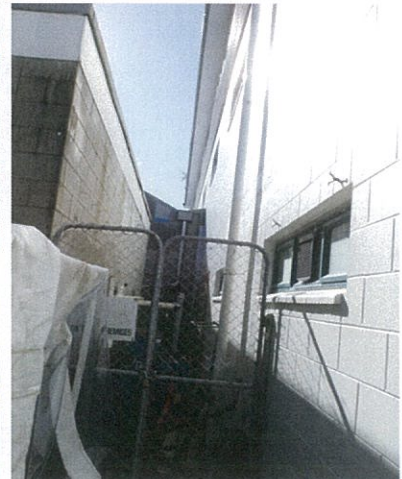
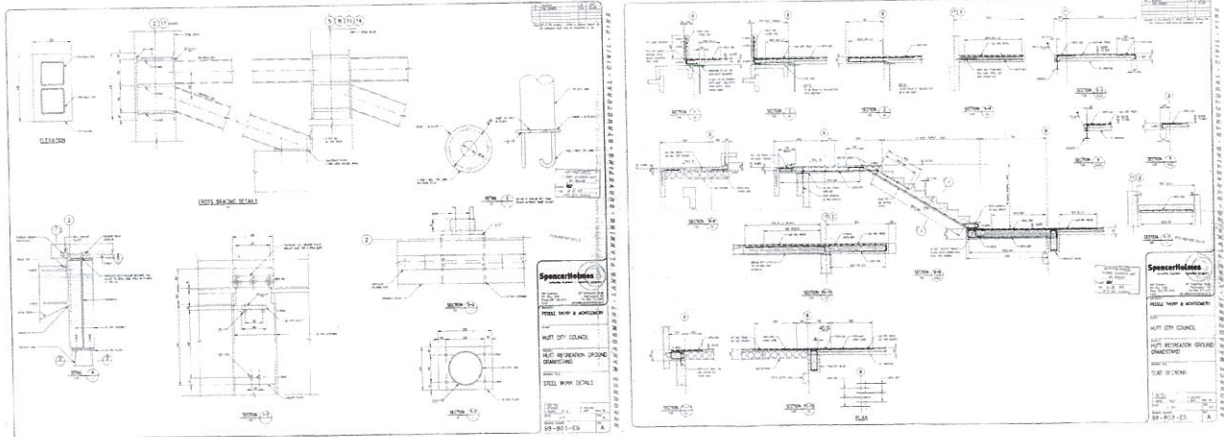
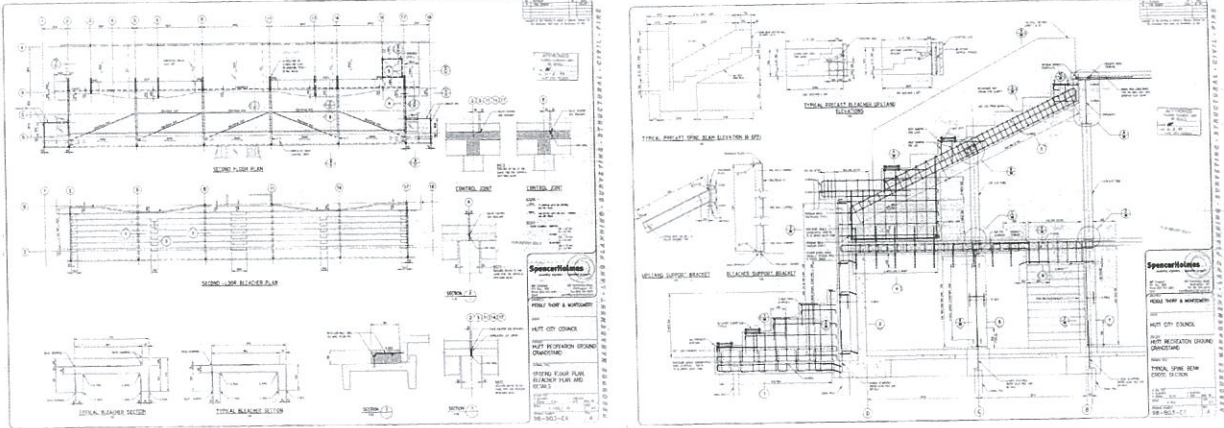
**WARNING!!** This initial evaluation has been carried out solely as an initial seismic assessment of the building following the procedure set out in the New Zealand Society for Earthquake Engineering document "Assessment and Improvement of the Structural Performance of Buildings in Earthquakes, June 2006". This spreadsheet must be read in conjunction with the limitations set out in the accompanying report, and should not be relied on by any party for any other purpose. Detailed inspections and engineering calculations, or engineering judgements based on them, have not been undertaken, and these may lead to a different result or seismic grade.

Initial Evaluation Procedure (IEP) Assessment - Completed for {Hutt City Council}

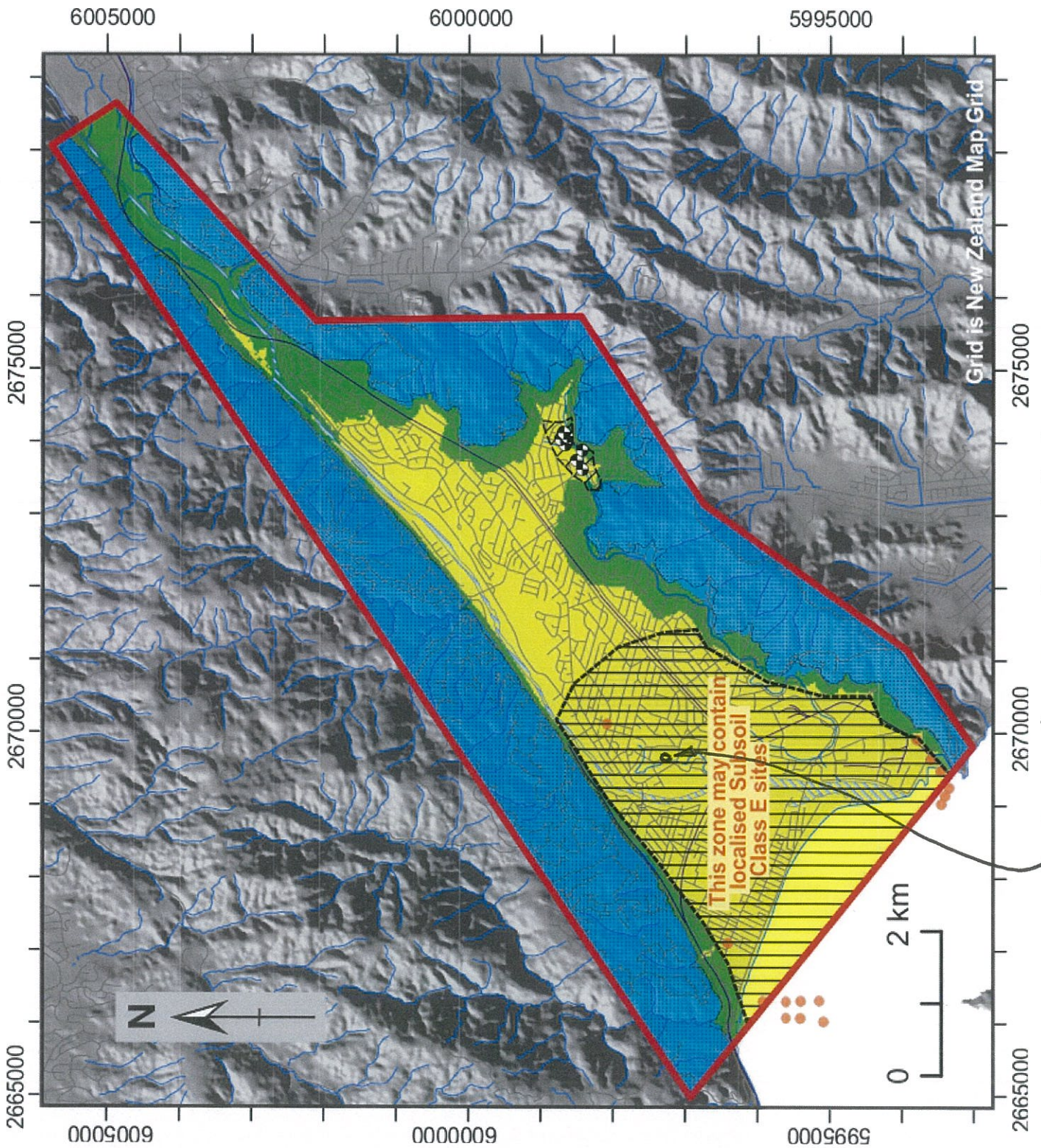
Street Number & Name:	Near 135 Woburn Road, Lower Hutt	Job No.:	8771
AKA:		By:	JW
Name of building:	Hutt Recreation Ground Grandstand	Date:	12/08/2014
City:	Lower Hutt	Revision No.:	1

Table IEP-1a Additional Photos and Sketches

Add any additional photographs, notes or sketches required below:



**WARNING!!** This initial evaluation has been carried out solely as an initial seismic assessment of the building following the procedure set out in the New Zealand Society for Earthquake Engineering document "Assessment and Improvement of the Structural Performance of Buildings in Earthquakes, June 2006". This spreadsheet must be read in conjunction with the limitations set out in the accompanying report, and should not be relied on by any party for any other purpose. Detailed inspections and engineering calculations, or engineering judgements based on them, have not been undertaken, and these may lead to a different result or seismic grade.



**Legend**

- Study Area
- Railway
- River
- Road
- Coastline
- Hutt River
- Class B - Bedrock exposed at surface

**Site subsoil class**

- Class B - Rock
- Class C - Shallow soil sites
- Class D - Deep or soft soil sites
- Zone that may contain Class E sites
- Class E? >10m very soft swamp deposits
- Known Class E site (>10m SPT 'N' <6)
- Drillhole proving >10m very soft swamp deposits

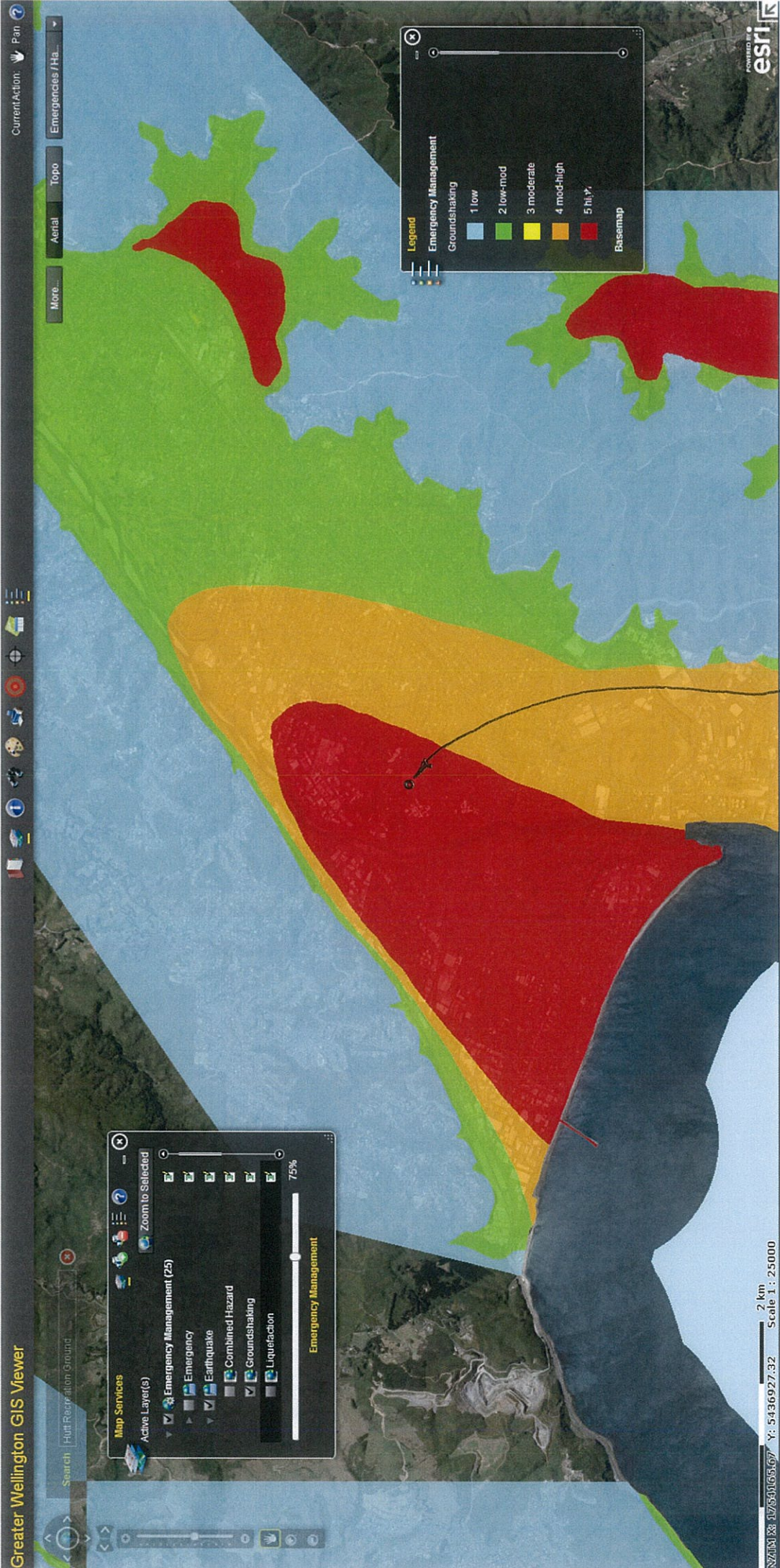
This zone may contain localised Subsoil Class E sites

Hutt Recreation Ground

Grid is New Zealand Map Grid

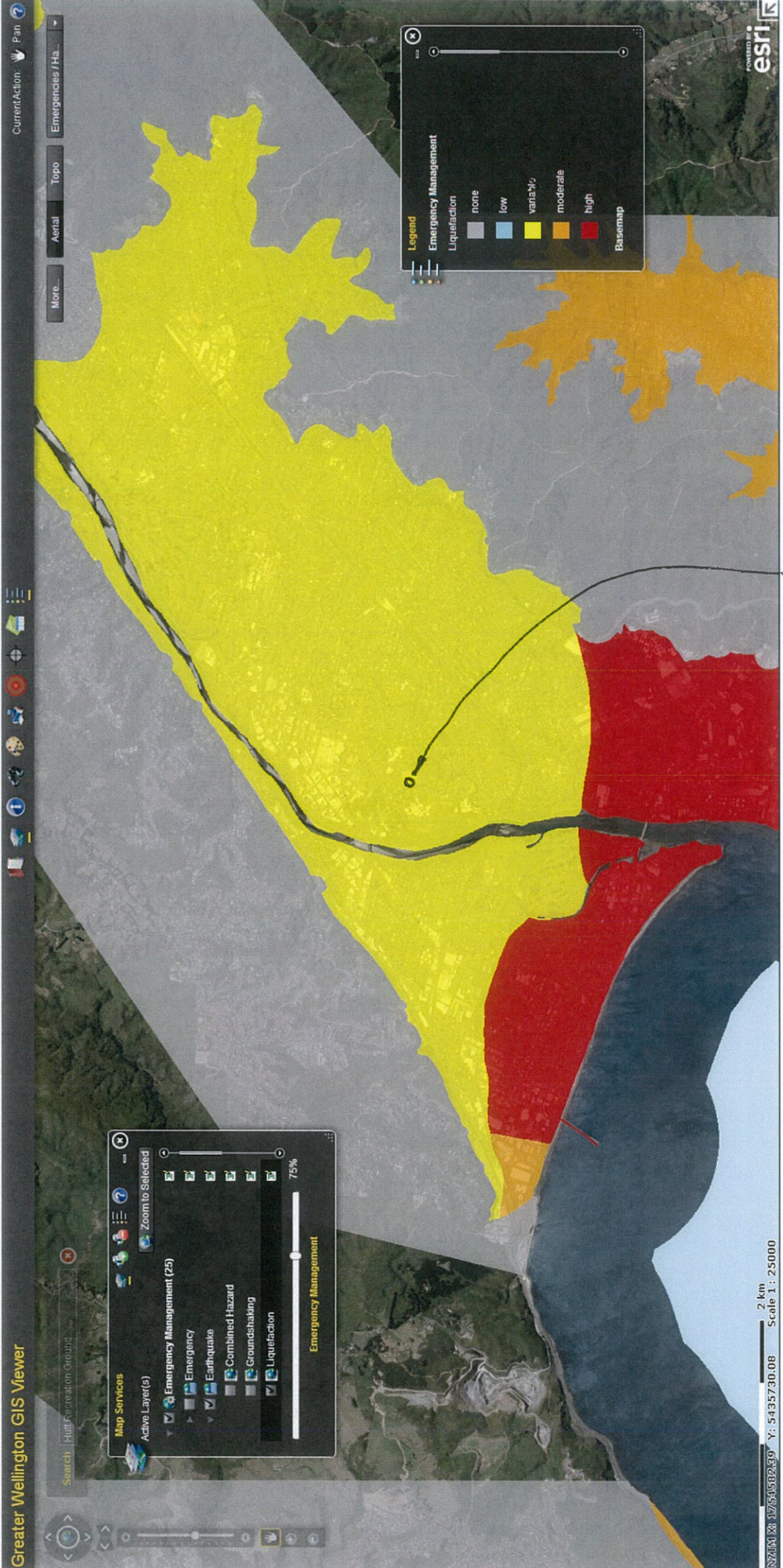


Opahu Stream



Huitt Recreation Ground Grandstand





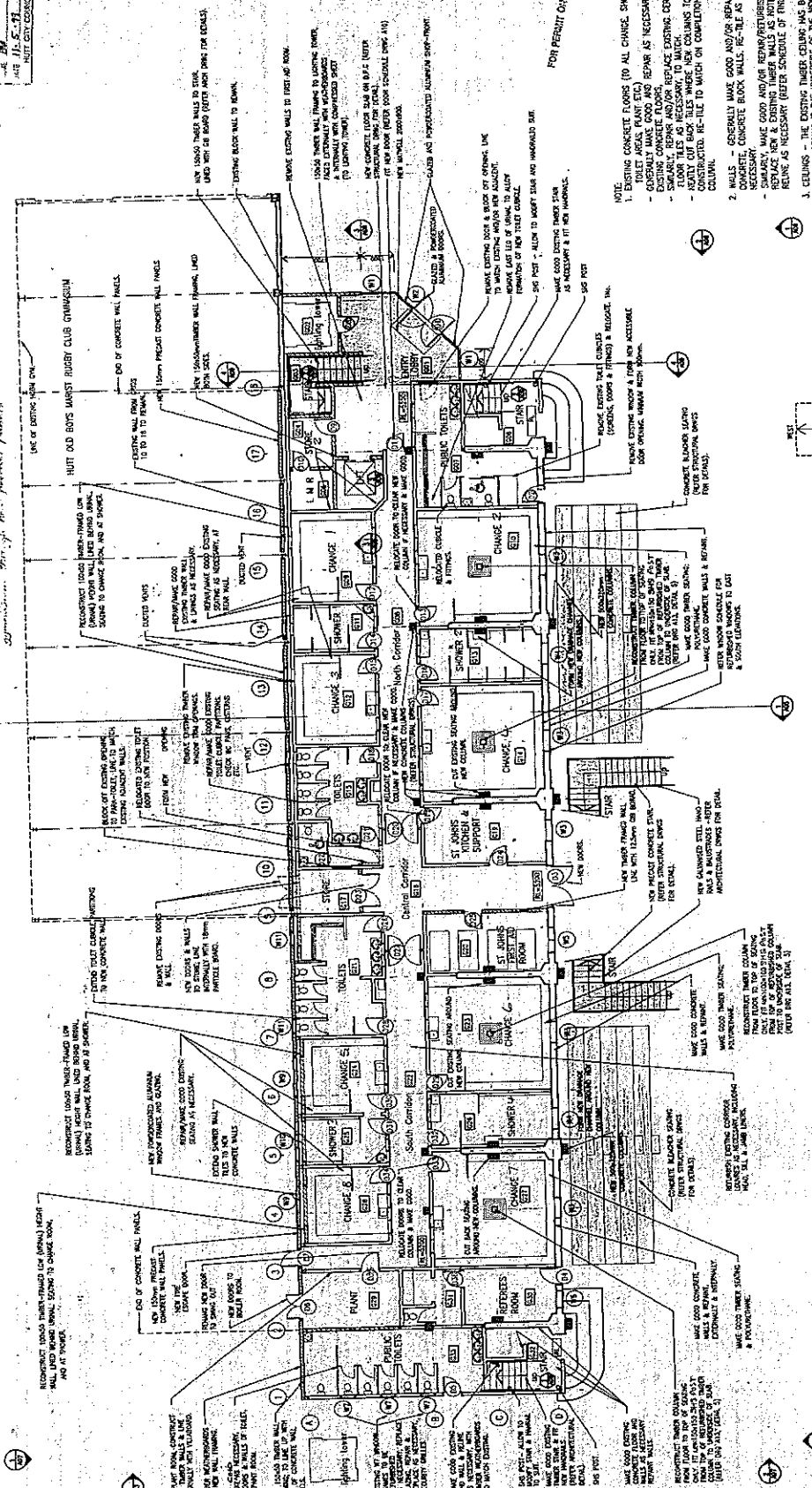
Hutt Recreation Ground Grandstand

APPROVED  
 HIND CONSENT MAY  
 BE ISSUED  
 DATE 11-5-71  
 BY THE ARCHITECT



NOTE: Existing wall grids 2 to 10 have been removed.

NOTE: Site of existing building shown with dimensions for existing building at 1/8" scale. Dimensions shown in feet. For further details see drawings.



1 GROUND FLOOR PLAN - EXISTING TOILETS, SHOWERS, CHANGE  
 SCALE 1:100

- FOR PERMIT ONLY
- EXISTING CONCRETE FLOORS (TO ALL CHANGE SHOWERS, TOILET AREAS PLANT ETC.) - GENERALLY MAKE GOOD AND REPAIR AS NECESSARY. ALL EXISTING FLOORS TO BE REPAIRED AND/OR REFINISHED AS NECESSARY. TO MATCH FLOOR TILES AS NECESSARY. TO MATCH REPAIR OUT LETS TO MATCH ON COMPLETION OF CONCRETE.
  - WALLS - GENERALLY MAKE GOOD AND/OR REPAIR/REFINISH EXISTING BRICK WALLS AS NECESSARY. CONCRETE WALLS TO BE REPAIRED AND/OR REFINISHED AS NECESSARY. REPLACE NEW & EXISTING TIMBER DOORS AND WINDOWS AS NECESSARY (SEE SCHEDULE OF FINISHES).
  - CEILING - THE EXISTING TIMBER CEILING HAS BEEN REMOVED. THE NEW CEILING IS TO BE LEVEL - (SEE SCHEDULE OF FINISHES FOR PAINTED/UNPAINTED FINISHES).
  - FINISHES - REFER SCHEDULE OF FINISHES FOR ALL FLOOR, WALL & CEILING FINISHES.

PROJECT NO.	881046
DATE	11/5/71
SCALE	A 02
NO.	0

GROUND FLOOR PLAN

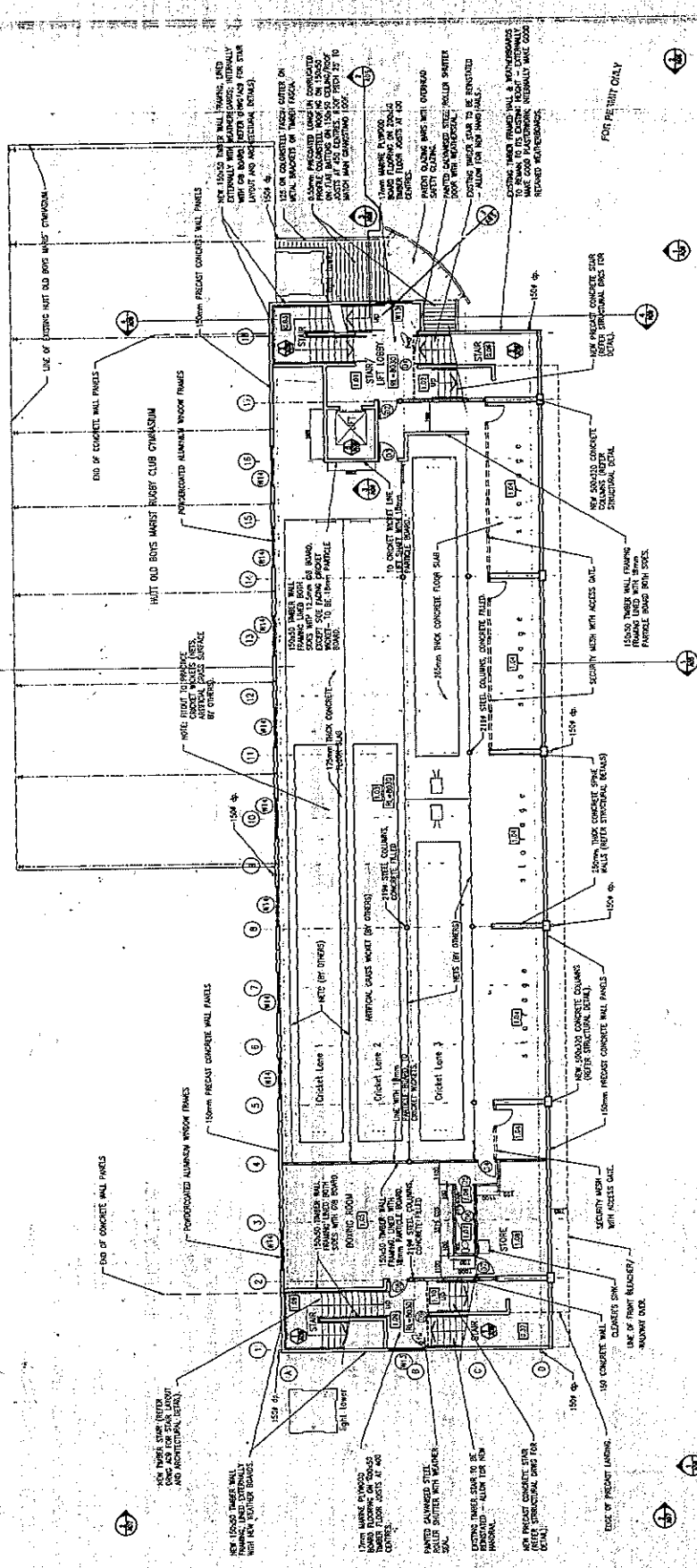
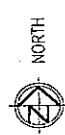
PEDDLE THORP & MONTGOMERY LTD.  
 Architects, Designers  
 23 Marky Taylor St, PO Box 3193, Wellington  
 Phone 472-1655 Fax 471-1056



HUTT RECREATION GROUND GRANDSTAND  
 HUTT CITY COUNCIL  
 MYRTLE STREET LOWER HUTT

DATE	11/5/71
SCALE	1:100
PROJECT NO.	881046
NO.	0

APPROVED  
 BUILDING CONSENT PLAN  
 TO BE ISSUED  
 UNDER THE BUILDING ACT 1974  
 BY THE CITY ENGINEER  
 HULL CITY COUNCIL



NOTE:  
 1. SPECIALIST FITOUT TO THE PRACTICE CRICKET WICKET IS BY OTHERS.  
 2. ARTIFICIAL GRASS SURFACE, NETS, FLOOR COVERINGS WITHIN SPACE.  
 1.0.3.



1 FIRST FLOOR PLAN - BOXING/INDOOR CRICKET WICKETS  
 SCALE 1:100

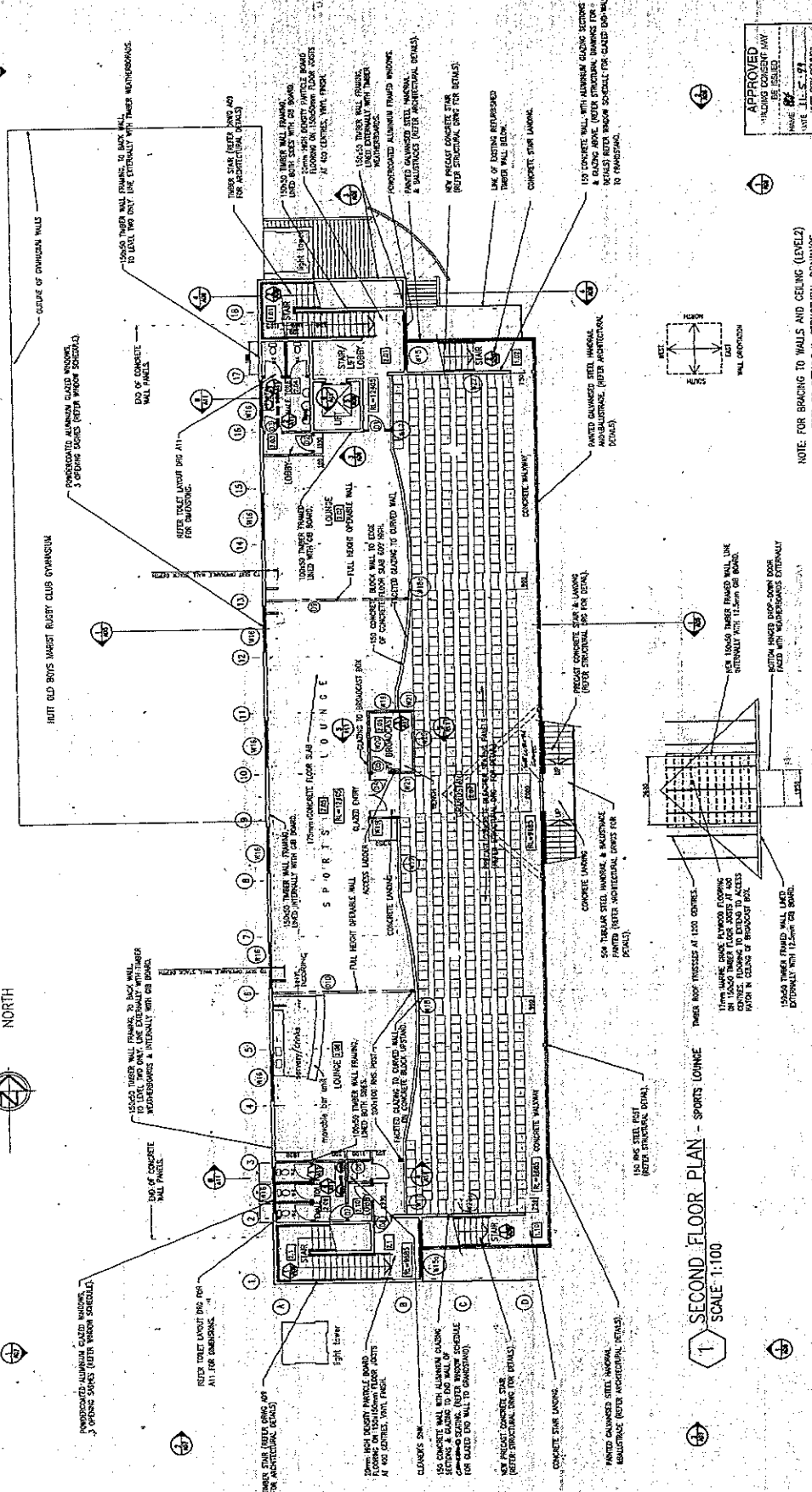
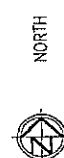
NO.	REVISED	DATE	BY	FOR
0	FOR ISSUE			

PROJECT	HULL CITY COUNCIL
BY	ARCHITECTS
DATE	7 APR 1991
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BY	
FOR	
NO.	931046
REVISED	
DATE	
BY	
FOR	
NO.	A 03
REVISED	
DATE	
BY	
FOR	

PEDDLE THOMP & MONTGOMERY LTD.  
 ARCHITECTS DESIGNERS  
 21 Voking Taylor St. PO Box 309, Vellington  
 Phone 061 478146 Fax 061 478156

HULL RECREATION GROUND GRANDSTAND  
 HULL CITY COUNCIL  
 MYRTLE STREET LOWER HUTT

NO.	REVISED	DATE	BY	FOR
0	FOR ISSUE			



1 SECOND FLOOR PLAN - SPORTS LOUNGE  
SCALE: 1:100

2 PLAN OF TV CAMERA ROOM  
SCALE: 1:100 - EAST ROOF GABLE AT ROOF LEVEL

APPROVED  
HUNTING CONSENT MAY  
BE ISSUED  
DATE 21.11.99  
BY CITY ENGINEER

FOR PERMIT ONLY

NOTE: FOR BRACING TO WALLS AND CEILING (LEVEL 2)  
REFER TO DETAILS & STRUCTURAL DRAWINGS.

NO.	REVISION	BY	DATE
1	ISSUED FOR PERMIT	...	...

DATE	7 April 1999
SCALE	AS SHOWN
PROJECT	HUTT CITY COUNCIL
CLIENT	HUTT CITY COUNCIL
DRAWING NO.	8810146
ISSUED BY	...
DATE	...
SCALE	...
PROJECT	...
CLIENT	...
DRAWING NO.	8810146
ISSUED BY	...
DATE	...
SCALE	...
PROJECT	...
CLIENT	...

PEOPLE THORP & MONTGOMERY LTD.  
Architects, Designers  
23 King George St, Box 333, Wellington  
Phone 04 475 2166 Fax 04 475 1916



PROJECT: HUTT RECREATION GROUND GRANDSTAND  
HUTT CITY COUNCIL  
MYRTLE STREET LOWER HUTT

NO.	REVISION	BY	DATE
1	ISSUED FOR PERMIT	...	...



NO.	REVISED	BY	DATE
1	AS SHOWN	DM	11.25.77
2	AS SHOWN	DM	11.25.77

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The Contractor shall verify all dimensions on site.

APPROVED  
HUTT CITY COUNCIL  
DATE ISSUED  
NAME  
DATE  
POST OFFICE BOX

**Spencer Holmes**  
consulting engineers - architects - surveyors

187 Parkside Street  
PO Box 100  
Dunedin 9012-2201  
New Zealand

PROJECT  
**PEDDLE THORP & MONTGOMERY**

CLIENT  
**HUTT CITY COUNCIL**

PROJECT  
**HUTT RECREATION GROUND GRANDSTAND**

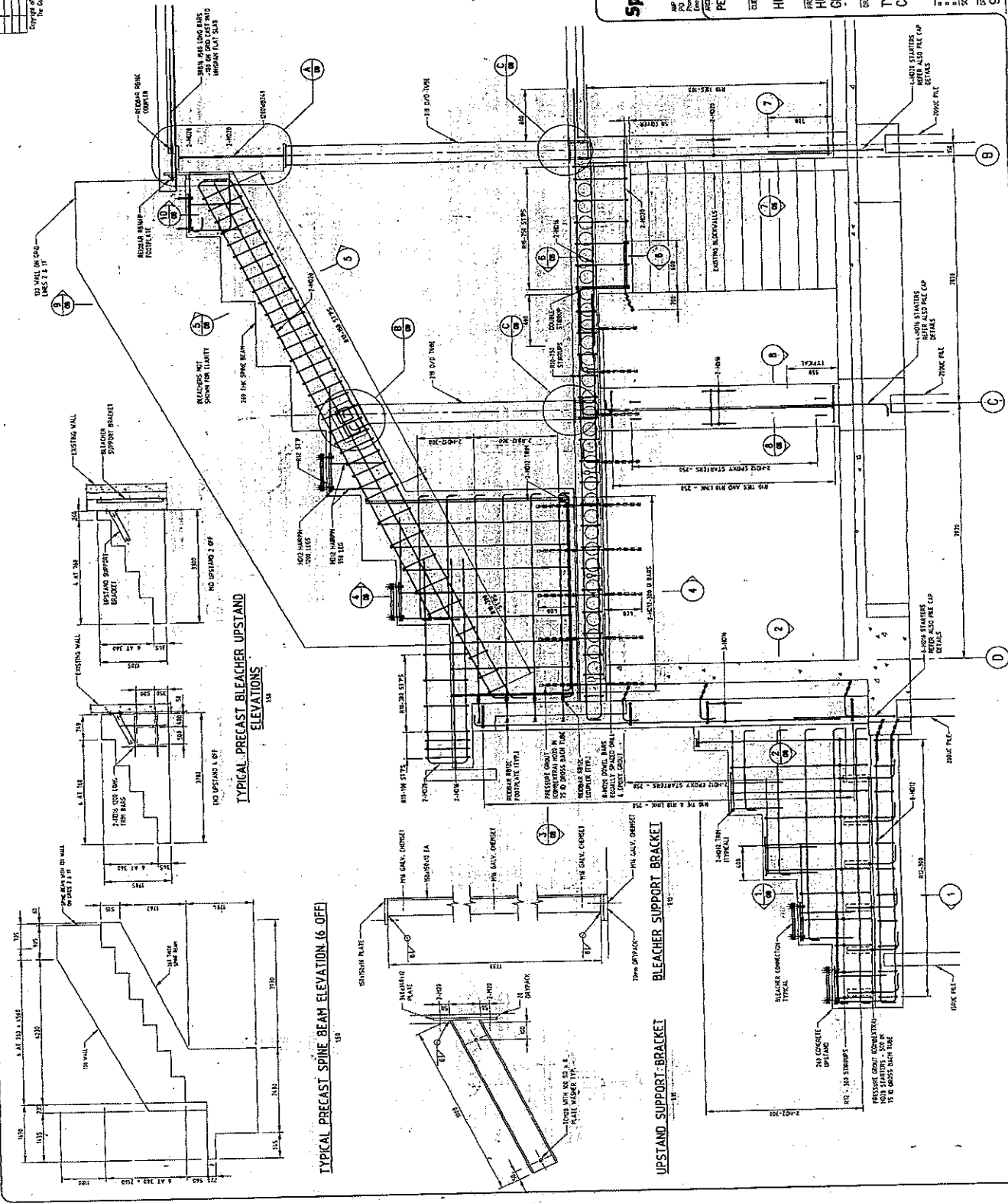
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SCALE  
1:20

DATE  
11.25.77

DRAWING NUMBER  
**98-803-E7**

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TYPICAL PRECAST BLEACHER UPSTAND ELEVATIONS

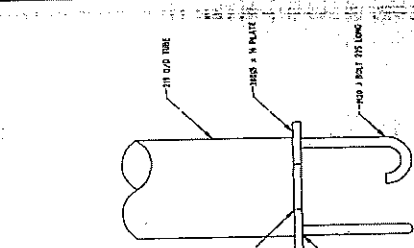
TYPICAL PRECAST SPINE BEAM ELEVATION (6 OFF)

BLEACHER SUPPORT BRACKET

UPSTAND SUPPORT BRACKET

NO.	REVISION	BY	DATE
1	ISSUE FOR PERMIT	...	...
2	...	...	...
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20	...	...	...

Check of this drawing is void if signed by anyone other than the Engineer and shall void if drawn on this paper.

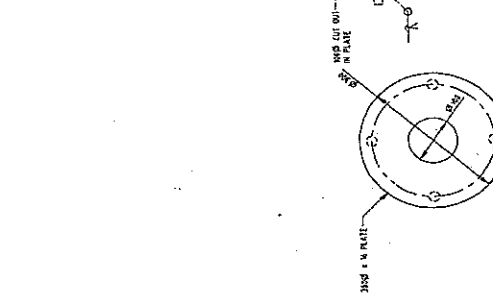


APPROVED  
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 NAME: ...  
 DATE: ...  
 VICE: ...  
 SIZE: CITY COUNCIL

DETAIL C  
 1/2 THK PLATE WITH 1/2 THK PLATE ON TOP FLANGE

**Spencer Holmes**  
 Consulting Engineers  
 1177 ...  
 ...  
 ...

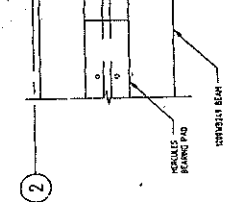
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 CLIENT: HUTT CITY COUNCIL  
 ARCHITECT: PEDOLE THORP & MONTGOMERY  
 DRAWING NO: 98-803-E9  
 SHEET NO: 11



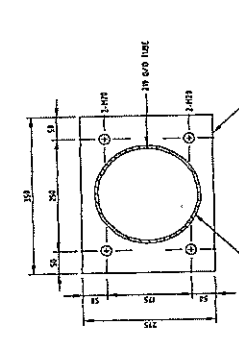
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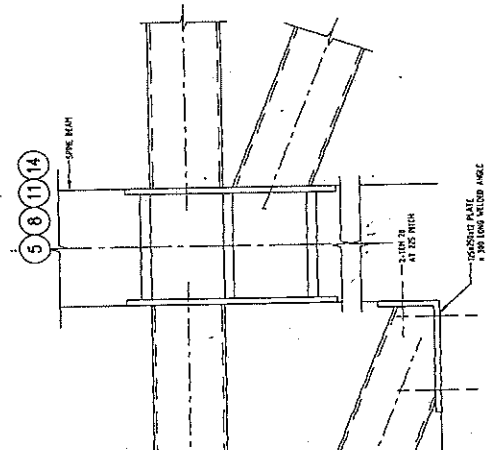
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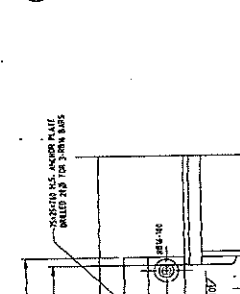
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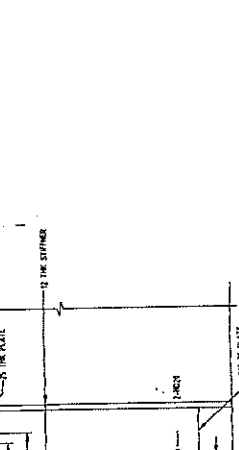
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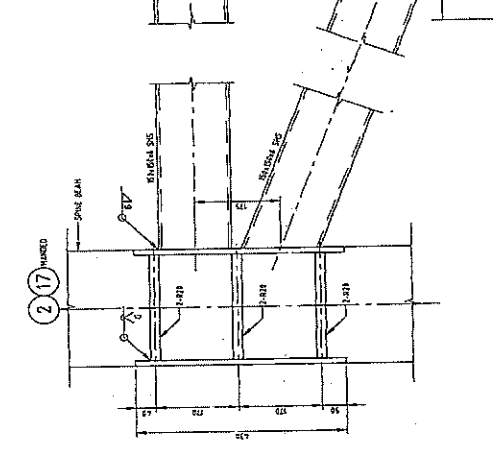
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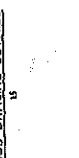
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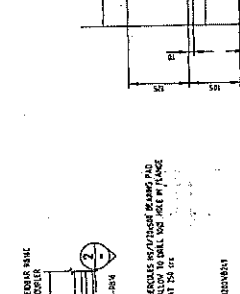
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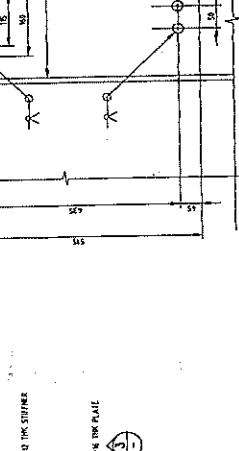
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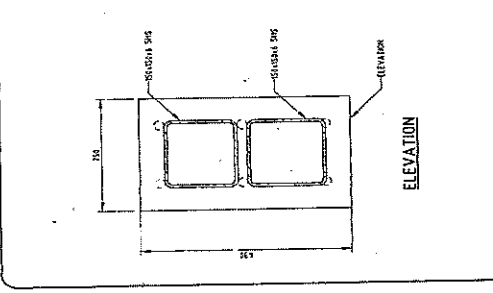
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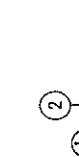
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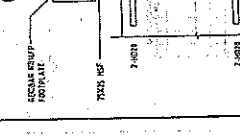
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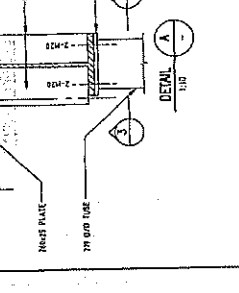
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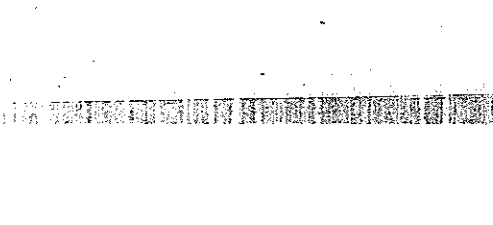
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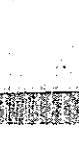
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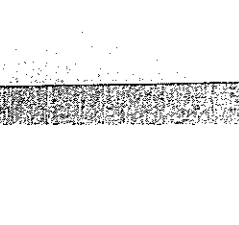
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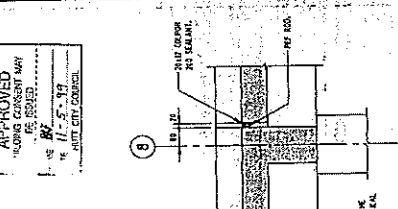
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SECTION 3-3  
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NO.	REVISION	BY	DATE

APPROVED  
 HUTT CITY COUNCIL  
 DATE 11-5-99



NOTE: - BRICKWORK IS TO BE SET OUT WITH THE VERTICAL UPSTAND ALSO.

FOR PERMIT ONLY

Spencerholmes  
 100 Clarendon  
 PO Box 500  
 Dunedin 9100  
 Phone (03) 482-0711  
 Fax (03) 482-0712

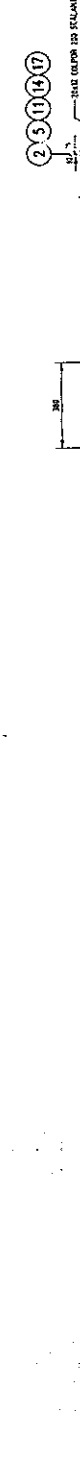
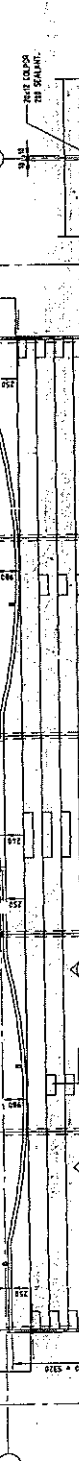
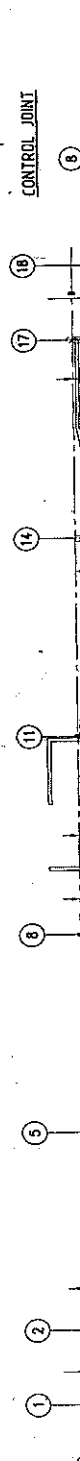
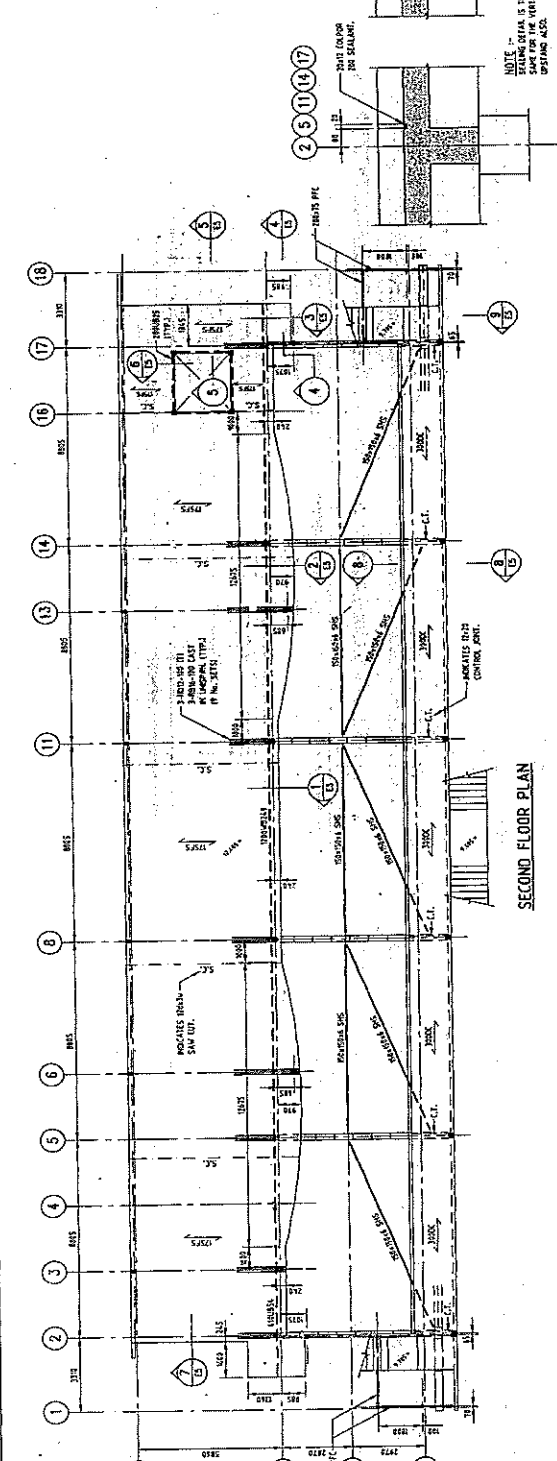
PEBBLE THORP & MONTGOMERY  
 100 Clarendon  
 PO Box 500  
 Dunedin 9100  
 Phone (03) 482-0711  
 Fax (03) 482-0712

HUTT CITY COUNCIL

PROJECT  
 HUTT RECREATION GROUND  
 GRANDSTAND

SECOND FLOOR PLAN,  
 BLEACHER PLAN AND  
 DETAILS

SCALE 1:100 (1:10)  
 DRAWING NUMBER  
 98-803-E4

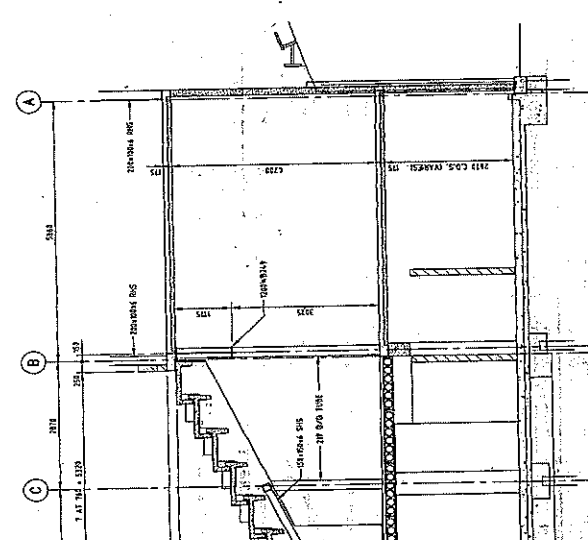
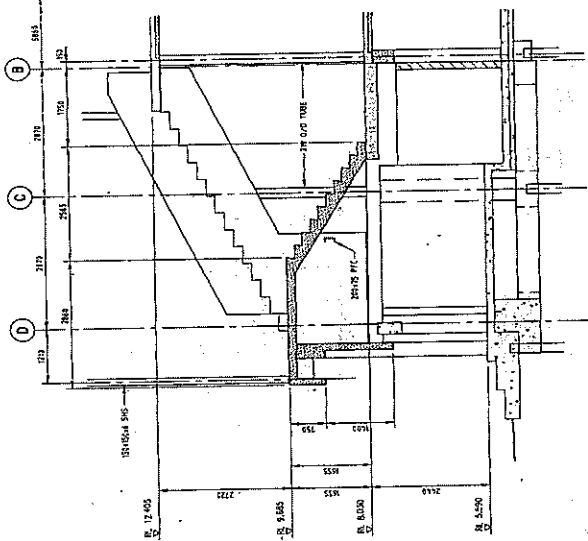






NO.	REVISION	DATE
1	AS SHOWN	11/13
2	BY THE ARCHITECT	11/13

Checked by the Engineer and only as dimensioned on plan.



SECTION 1-1  
1:50

SECTION 2-2  
1:50

**LEGEND**

- TO UNIFORM WITH (N) (1974)
- 441 RMC PERKINS
- 2355 - 2ND FLOOR WITH (N) (1974)
- 441 RMC PERKINS

**NOTES**

- 1. FLOOR FINISHES - SEE PLAN
- 2. SEE PLAN FOR FINISHES
- 3. SEE PLAN FOR FINISHES
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- 50. SEE PLAN FOR FINISHES



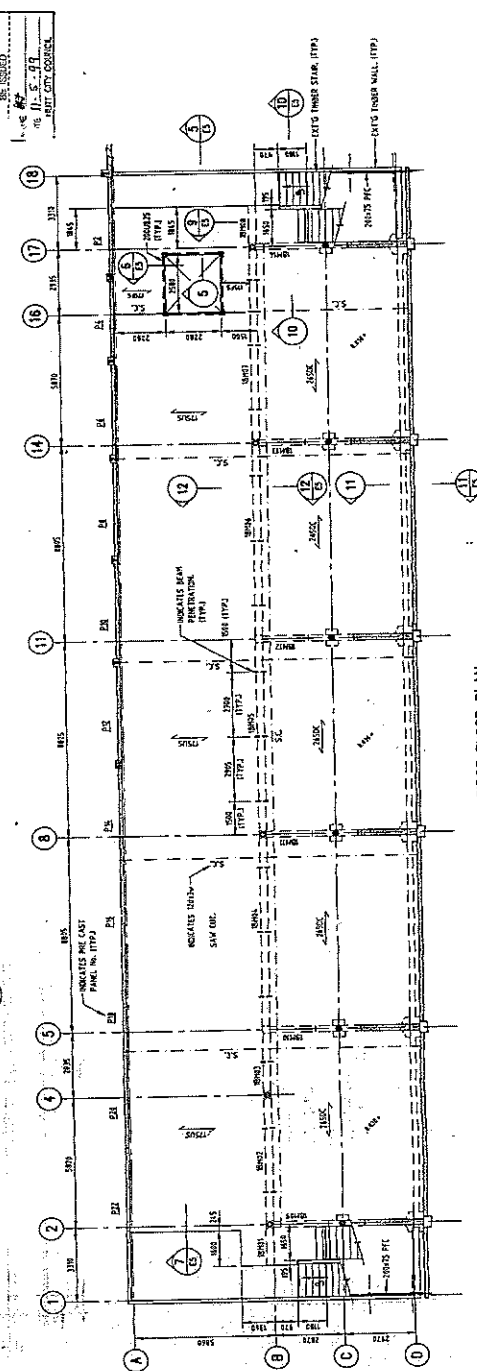
117 W. GARDNER ST.  
MONTGOMERY, ALA. 36102  
PHONE (205) 271-2283  
FAX (205) 271-2283  
WWW.SPENCERHOLMES.COM

PROJECT  
HUTT RECREATION GROUND  
GRANDSTAND

CLIENT  
HUTT CITY COUNCIL

DRAWING TITLE  
FIRST FLOOR PLAN  
AND CROSS SECTIONS

DATE	1:100/1:50
SCALE	1:100/1:50
PROJECT NUMBER	98-803-E3
REV	A1
REV	A



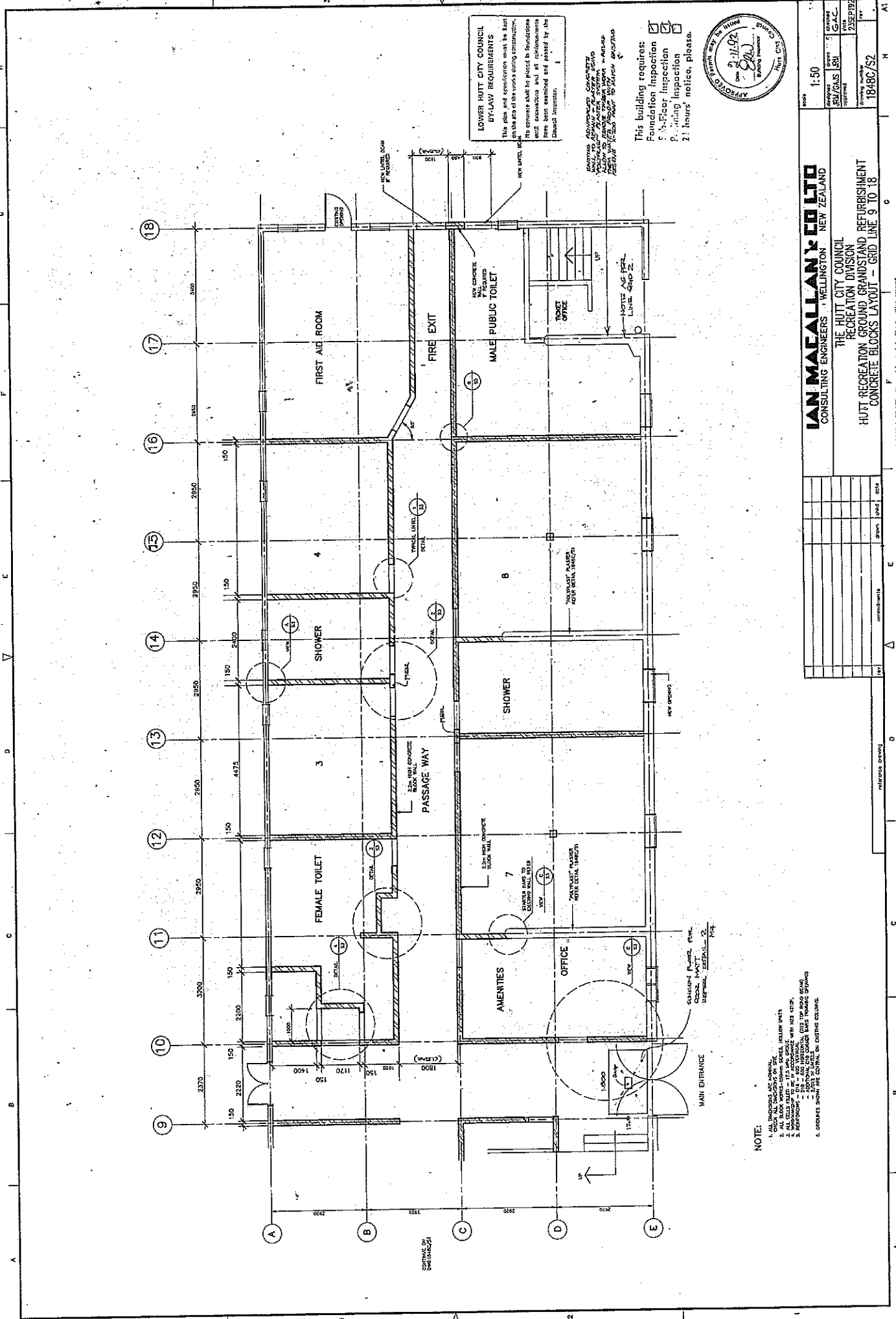
FIRST FLOOR PLAN

SECTION 1-1  
1:50

SECTION 2-2  
1:50

APPROVED FOR SUBMITTAL ONLY  
BY THE ARCHITECT  
DATE 11/13/13





**LOWER HUTT CITY COUNCIL  
BYLAW REQUIREMENTS**

This plan and specification must be kept on the site of the works during construction. The concrete shall be placed in foundations, walls, excavations and all reinforcements have been examined and signed by the Council Inspector.

**WARNING: REINFORCED CONCRETE**  
 REINFORCING BARS SHALL BE PLACED AS SHOWN AND SHALL BE PROTECTED BY SAND OR OTHER MEANS TO PREVENT CORROSION.  
 REINFORCING BARS SHALL BE PLACED AS SHOWN AND SHALL BE PROTECTED BY SAND OR OTHER MEANS TO PREVENT CORROSION.

This building requires:  
 Foundation Inspection   
 Floor Inspection   
 Working Inspection   
 24 hours' notice, please.



**IAN MACALLAN & CO LTD**  
 CONSULTING ENGINEERS - WELLINGTON - NEW ZEALAND

THE HUTT CITY COUNCIL  
 RECREATION DIVISION  
 HUTT RECREATION GROUND GRANDSTAND REFURBISHMENT  
 CONCRETE BLOCKS LAYOUT - GRID LINE 9 TO 18

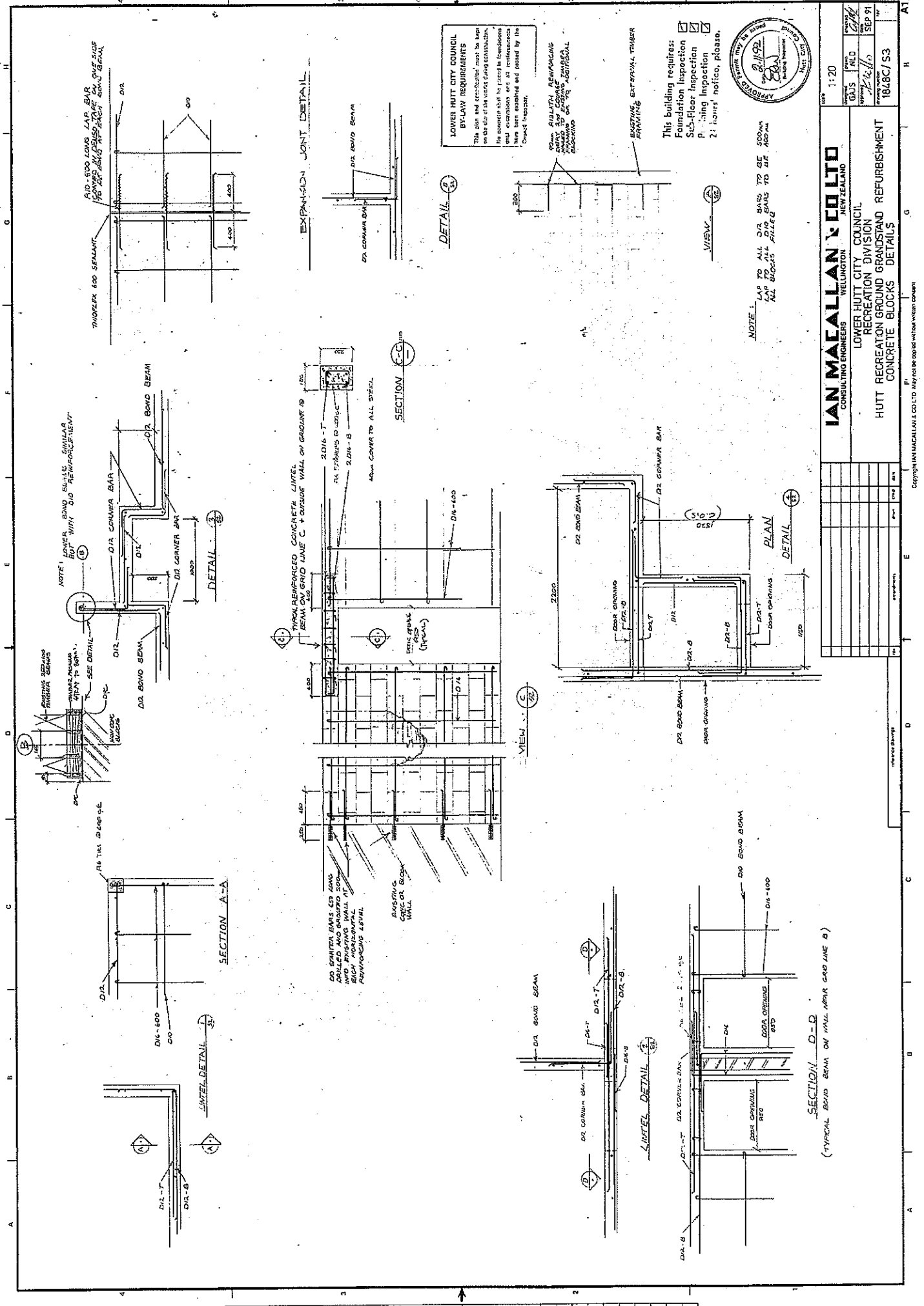
NO.	DATE	REVISIONS	BY	CHECKED	DATE

**NOTE:**

1. CHECK ALL DIMENSIONS ON SITE.
2. ALL BLOCK SPACES - SHOW SPACES, FOLLOW UNITS.
3. DIMENSIONS TO FACE UNLESS SPECIFIED OTHERWISE.
4. DIMENSIONS TO FACE UNLESS SPECIFIED OTHERWISE.
5. DIMENSIONS TO FACE UNLESS SPECIFIED OTHERWISE.
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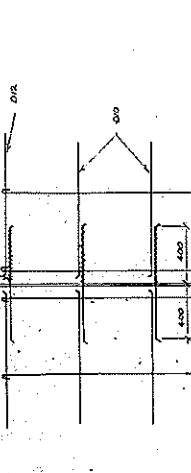




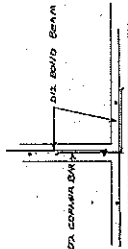


NOTE: FORMS BOND WITH ALL REINFORCEMENT

THICKEN 600 SEAMANT



EXPANSION JOINT DETAIL



DETAIL 2

**LOWER HUTT CITY COUNCIL  
SPECIFICATION REQUIREMENTS**  
This plan and specification must be kept on file at the works during construction. The contractor shall be liable for foundations and excavations and all reinforcements have been examined and passed by the Council Inspector.

FORMS BOND WITH ALL REINFORCEMENT

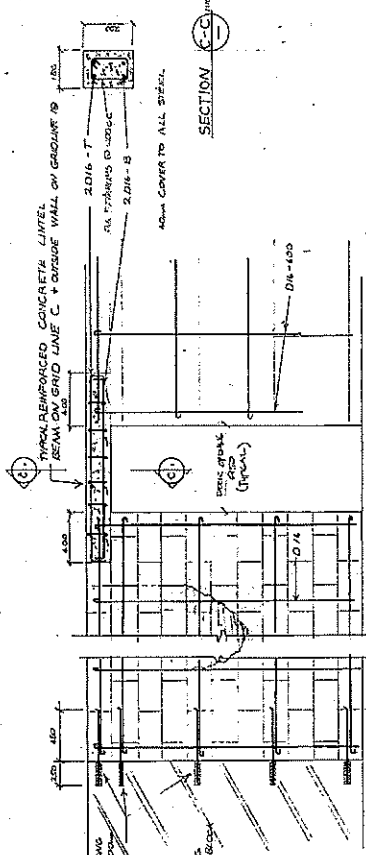
EXISTING EXTERNAL TRIMMER  
BRACING

This building requires:  
Foundation Inspection  
Sub-floor Inspection  
Planning Inspection  
21 hours' notice, please.



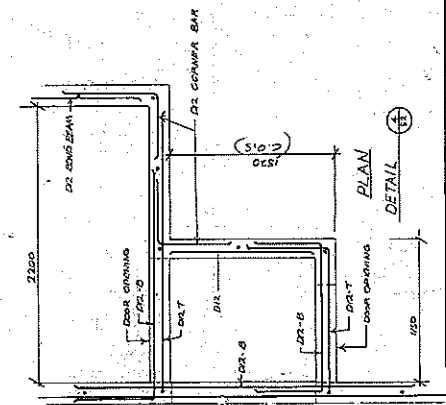
NOTE: LAP TO ALL D18 BARS TO BE 500mm  
LAP TO ALL D18 BARS TO BE 400mm  
ALL BLOCKS ALIGNED

VIEW E



SECTION C-C

VIEW E



PLAN DETAIL

SECTION D-D  
(TYPICAL BOND BEAM ON WALL NEAR GRID LINE B)

**IAN MACALLAN & CO LTD**  
CONSULTING ENGINEERS WELLINGTON NEW ZEALAND

LOWER HUTT CITY COUNCIL  
RECREATION DIVISION  
HUTT RECREATION GROUND GRANDSTAND REFURBISHMENT  
CONCRETE BLOCKS DETAILS

DATE: 11/20  
DRAUGHTSMAN: [Signature]  
CHECKED BY: [Signature]  
SCALE: 1:20  
PROJECT NO: 18/8C/S3

